Episode 14: Represent!

Show Notes

The representativeness heuristic is another rule-of-thumb that we use when we need to make a decision. We apply it when we decide an event is likely to happen if it resembles, or is representative, of the category from which it belongs.

Game References
Assassins Creed, Dungeons and Dragons, El Grande, God of War, Incan Gold, Last of Us, Lords of Hellas, Risk, Rising Sun, Small World, Watch Dogs

Research References

Tversky, A., & Kahneman, D. (1974). Judgment under uncertainty: Heuristics and biases. *Science*, *185*(4157), 1124-1131.

Englestein, G. **GameTek Classic 163 - Theme, Mechanics, Experience**
http://ludology.libsyn.com/gametek-classic-163-theme-mechanics-experience

Transcript

Hello! This is Episode 17 of the Cognitive Gamer podcast. I am your host, Steve Blessing. Since the last podcast, I've taught a class during our university's two week May term. It's an intense time of teaching and learning, with my class going from 8am to 1pm everyday for the 2 weeks. Like last May, I taught my Cognition of Game Playing class, and it went extremely well. The students learned cognitive psychology, and played games while doing it. I have written a short after action report and put it on my boardgamegeek blog, as well as the cognitive gamer website. Have a look, if you're interested!

Also, here's one more news item. I am getting ready for my presentation at the Tabletop Network Conference coming up June 8 and 9 in Salt Lake City. I am excited for it! Maybe I'll see some of you there. And, virtual passes are still available. Those passes will give you access to the videos of all the presentations. If you are at all interested in game design, it would be worth it! Check out tabletopnetwork.com for more information. There will be some awesome presentations to see and listen to.

Now, let's get into the episode. I am going to continue a discussion I started in Episode 14 about decision making heuristics. These are the rules of thumb that we use quite frequently to make quick, efficient decisions. Usually they allow us to make pretty good decisions, but not always. In episode 14, I talked about the availability heuristic. If you remember, that's when we do a quick count of how frequently something has occurred in the past, and then base our current decision on that information.

Tversky and Kahneman talked about two other heuristics in their landmark 1974 paper, and I'm going to discuss another one of these today, the representativeness heuristic. We use the

representativeness heuristic when we decide if an event is likely if it resembles, or represents, the typical features of its larger category. We are essentially making use of the statistical regularities that exist within the environment. In class when I introduce the representativeness heuristic, I show my students a picture of a college-age male on a beach, and I describe him as someone who you just met on a visit to a California. He has just come in from surfing. I tell my students they have just met this guy, and they are sharing what they like to do. I ask them what other hobby beside surfing do you think this guy says he likes to do, and I offer them the choices of watching old movies, knitting, playing beach volleyball, or growing a vegetable garden. Most students choose playing beach volleyball, because given the picture I've painted of this guy, that probably is the most likely choice, because it's the most representative of that type of person. I stress that there's really no right answer here; if this was a real guy, he could very well like to both surf and knit, but typically speaking, out in the real world, those two things usually don't go together. It's much more common to find someone who both likes to surf and play beach volleyball, so when asked to choose, almost all people choose that option, as opposed to being more evenly split.

Like the availability heuristic, this rule of thumb comes into how we choices a lot in our day-to-day lives, including playing games. Say you are playing a new area control game, like Rising Sun or Lords of Hellas. You haven't played this particular area control game before, but are familiar with how these games work, by having played say El Grande or Small World. At least some of your decisions in the new game will be influenced by the representativeness heuristic. You've either been told beforehand or you quickly come to understand that Lords of Hellas is indeed an area control game, and so you will elect to make the types of moves that have been successful in the past for you in other area control games, perhaps consolidating power in a particular region. In other words, consolidating power is representative of a good strategy in that type of game, and so you will choose to follow that strategy, regardless of how useful it may actually be in that particular game.

As another quick example, I have just started to play the new God of War game on my Playstation. This is the first God of War game I have played, so I'm not exactly sure what to expect, though I have read a couple of reviews, and listened to discussions about it on some podcasts. The start of the gameplay is a bit like The Last of Us or the Uncharted series, in that it's pretty linear in how it tells its story, but now that I'm a few hours in, it's opening up a bit, a little like an open world game, such as Assassins Creed or Watch Dogs. This ambivalence is affecting my game play a little bit, because I'm not really able to use the representativeness heuristic, to determine best how I should approach the game, in terms of searching the environment for clues, secrets, and additional things to do. I'm not sure how easy it may be to come back to a given point.

As the last example illustrates, because these are heuristics, they will sometimes lead us astray. My confusion over God of War stems from wanting to categorize it, because that's what humans do, but not quite being able to, because it has features that are representative of a couple of different categories of games. Let's talk about another two cases where the representative heuristic will lead us to maybe making a wrong choice, the gambler's fallacy and base rate neglect. Again, let me stress, more often times than not following the representative heuristic will lead us to a good decision. By and large the world is not random, and we as humans are

okay at picking up on the statistical regularities of the environment, and that's why both the availability and representativeness heuristics are good decision making strategies. But, as both the gambler's fallacy and base rate neglect will show, they are not perfect.

The gambler's fallacy is so named because it often shows up in those sorts of contexts where you find a gambler. The way I usually introduce it is by offering a bet to students. I show three different sequences of 8 coin tosses, and they need to decide which sequence they would bet on as being most likely. Before I tell you the sequences, I'll state that this is a fair coin, and you are betting on the exact sequences of the 8 coin tosses. Sequence A is HHHHHHHH. Sequence B is HHTHTTHH and Sequence C is HTHTHTHT. Which sequence would you bet on? A clear majority of students choose Sequence B, because they are following the representativeness heuristic. That sequence HHTHTTHH is more representative of what someone expects a sequence of 8 coin tosses to look like, some seemingly random sequence of heads and tails. But, given a fair coin, the probability of getting any of those sequences, even the one with all heads, is the same, 1 out of 256. To also illustrate the gambler's fallacy, I then point out Sequence A again, the one with all heads. I then say I make a ninth flip of the coin. If the first 8 was this, all heads, what's the ninth flip going to be? Many students will say tails, because it's gotta be, right? After 8 heads in a row, the 9th toss has just got to be tails. But no, just like on all the other flips, the probability of tails is still 1 out of 2. The coin has no memory, and each toss is independent of the other tosses. But, certain sequences seem more representative than other sequences, and after a run of a certain value, it seems like it's time for another value to show. This feeling is pretty ubiquitous, and hard to get away from, even if you know what's happening. That's why casinos have those boards next to the roulette wheel that show you the last several rolls of the ball. When you see black has come up 3 or 4 times in a row, people are more likely to bet on red. Or, the next time you're playing Dungeons and Dragons, or Risk, or any game involving dice, if you've had a run of all low numbers, you're much more likely to think you are due a high number next, and will make a decision accordingly.

Another example of when the representative heuristic may lead you down a wrong path is something called base rate neglect. Base rate neglect is when you make a decision without using all the available data you may have. Instead, you make a decision based on how representative the choice seems to be. As a very simple example of base rate neglect, let me give you this scenario: "Tom is an opera buff who enjoys touring art museums when on vacation. Growing up, he enjoyed playing chess with family members and friends." Now then, is it more likely that Tom is a trumpet player for a major symphony orchestra, or is it more likely that Tom is a farmer? Many people will say it's more likely that Tom plays for a symphony, because the description I read is more representative of that type of occupation. But, think about how many trumpet players there are for major symphony orchestras. Probably less than 400 in the United States, as there are just over 100 major symphonies in the US. Now, how many farmers are there? At least a couple of million. And, at least some of them will like opera and play chess. Even if it's a very small percentage, there's still probably more than 400 of them. So, statistically speaking, just based on base rates, it's more likely that Tom is a farmer. Just not a very representative one.

Game players ignore base rates as well. We are likely to make a bad decision because we don't fully take into account all the information that is available to us, either because it's overly

complicated or it's just not fun to do so. We will make a choice based on the representative heuristic, where we ignore some of the base rate information, because that choice seems better than another one. For those of you who follow Geoff Englestein on twitter, you may have seen a couple of weeks ago that he mentioned a research project that I've started, using one of his ideas from a GameTek episode about the relationship between theme and mechanics. He wondered what would happen if you took the mechanics of Incan Gold, a press your luck type game, and used a firefighter theme instead of its standard adventurer theme. We'll see if theme makes a difference here, but regardless of that aspect, I imagine people play this with the representativeness heuristic in mind. My research assistant Elena and I have been playtesting it, trying to figure out how we are going to actually do the experiment, we've wondered how the sequence of the revealed cards also affects game play. Players will take a look at the revealed cards, and use the representativeness heuristic to determine if now is a good time to press on or go back to camp. And, on average, that's probably not a bad way to go. But, if hazards come out early, that's going to affect decisions just like if high value cards come out early. In theory people can know the distribution of the hazards and the treasures in the deck yet to be revealed, but I imagine that people are susceptible to both the gambler's fallacy and base rate neglect as they make the decision as to stay or to go. They might think, "We've had three treasures in row; the next card has to be hazard." So, that's something else we're going to need to manipulate or at least control for, the order in which cards are revealed. It will be interesting if that also interacts with theme. As scientists like to say, that's an empirical question, and we're excited to find the answer.

I hope you have enjoyed this continuing discussion on decision-making heuristics. Again, we'll be talking about additional heuristics and fallacies on future podcasts, in this mini-podcast format. And, if you haven't done so already, check the Tabletop Network conference; you may want to attend virtually. As always, I welcome any comments or questions you may have, so please email me, steve@cognitivegamer.com and also visit my website, cognitivegamer.com. Also, you can like me on Facebook, Cognitive Gamer, or follow me on Twitter, @cognitive_gamer.

I'd appreciate it if you took the time to give this podcast a rating and a few kind remarks on iTunes or wherever you listen to Cognitive Gamer. This will make it easier for other people to discover the podcast. I appreciate those 5-star reviews! Until next time, remember to think about what you play, and have fun doing it.